

FLOOR ASSEMBLY FOR GRILL

CROSS-REFERENCE TO RELATED APPLICATIONS:

This application is a continuation-in-part of U.S. Patent Application No. 09/927,897, filed August 10, 2001. U.S. Patent Application No. 09/927,987 is hereby incorporated by reference, and made a part hereof.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT:

Not Applicable.

TECHNICAL FIELD:

The present invention relates to a grill assembly with a shelf component. More specifically, the present invention relates to a floor assembly for a barbecue grill.

BACKGROUND OF THE INVENTION:

As the popularity of barbecue grills has increased, manufacturers have employed many types of shelves or trays for use in the frame supporting the barbecue grill. Generally, the tray is connected to a lower portion of the frame. Typically, the trays are connected to the extremities of the lower portion with fasteners and hardware such as nuts and bolts. The tray can be configured to provide support for other elements, including a fuel tank.

A concern with trays of this type is the difficulty in properly connecting the tray to the lower portion of the frame. A second concern is providing sufficient structural integrity of the tray and frame. A related concern is a possible loss of structural integrity due to the multiplicity of fasteners used to connect the tray to the lower portion of the frame.

An example of a gas barbecue grill having a tray design susceptible of such concerns identified above is U.S. Patent No. 5,579,755 issued to Johnston. As shown in FIGS. 1 and 2 therein, the barbecue grill is supported by a complex frame with a lower portion. The tray is connected to vertical supports positioned at the extremities of the lower portion of the frame. A combination of threaded fasteners and nuts are used to connect the tray to the vertical supports. Prior to connecting the tray to the vertical supports, the lower portion of the frame lacks any cross-member support.

Due to the thin-wall construction of the tray and the use of threaded fasteners that are susceptible to loosen over time, the frame may naturally experience a reduction in structural integrity.

Another example of a barbecue grill design with the concerns identified above is U.S. Patent No. 5,072,718 issued to Seal. Referring to FIG. 2 therein, the barbecue grill is supported by a frame comprising a plurality of bent tubular members and a tray. The tray is connected to vertical supports positioned at the extremities of the frame. A combination of threaded fasteners and nuts are used to connect the tray to the vertical supports. Like the '755 Patent to Johnston, prior to connecting the tray to the vertical supports, the lower portion of the frame lacks any cross-member support.

Therefore, there is a definite need for a shelf for use in a barbecue grill assembly that is durable and provides an enhanced degree of structural integrity to the frame supporting the barbecue grill. In addition, there is a need for a shelf that can be simply and reliably connected to the frame without the use of fasteners.

The present invention is provided to solve these and other problems.

SUMMARY OF THE INVENTION:

The present invention relates to a shelf for a barbecue grill frame assembly. In one embodiment the barbecue grill frame assembly comprises an upper frame assembly and a lower frame assembly. The upper assembly is adapted to receive a cooking chamber. The lower assembly has a shelf and a plurality of lower frame members. The lower frame members define an interior space. Alternatively, the barbecue grill assembly has a single frame assembly with a plurality of frame members defining an interior space.

According to one aspect of the present invention, the shelf is a rigid structure with a perimeter cooperatively dimensioned with the interior space such that the shelf can be positioned within the interior space.

According to another aspect of the present invention, at least one of the lower frame members has an aperture. The shelf has at least one pin positioned on an edge of the shelf. The pin is cooperatively dimensioned with the aperture such that the pin is removably received by the aperture. When the shelf and the frame member are connected in this manner, the lower assembly has a rigid and stable construction thereby increasing the structural rigidity of the barbecue grill assembly.

Because the pin is adapted to be removably received by the aperture, the shelf can be quickly and easily disengaged from the lower frame member. As a result, the packaging and storage options for the grill assembly are increased.

According to another aspect of another embodiment of the present invention, the shelf has at least one securing member and at least one supporting member. The securing member is adapted to move between a first position, wherein the securing member engages an inner portion of the lower frame member, and a second position, wherein the securing member engages a bottom portion of the lower frame member. In the second position, the supporting member engages at least an upper portion of the lower frame member.

The first position is a transitory position, whereas the second position is a stable position. In the second position, the shelf is connected to the lower frame member thereby securing the lower assembly. As a result, the structural rigidity of both the lower assembly and the barbecue grill assembly is increased.

According to another aspect of another embodiment of the present invention, the shelf has at least one securing member, one supporting member, and one finger. In the first position, the finger slidingly engages an inner portion of the lower frame member. In the second position, the finger engages the inner portion to prevent movement of the shelf with respect to the lower frame member.

According to another aspect of the present invention, a shelf is provided for a barbecue grill having a barbecue grill frame assembly. The shelf comprises a bottom wall, a first sidewall depending from the bottom wall, and a first quick release member secured to the first sidewall.

According to another aspect of another embodiment of the present invention, the first quick release member is moveable from a first position to a second position. In the first position the quick release member secures the shelf to the barbecue grill frame. In the second position the quick release member is configured to allow detachment of the shelf from the barbecue grill frame assembly.

According to another aspect of another embodiment of the present invention, the shelf also has a second sidewall depending from the bottom wall, and a second quick release member secured to the second sidewall. Like the first quick release member, the second quick release member secures the shelf to the barbecue grill frame assembly in a first

position, and the second quick release member adjusts to a second position to allow detachment of the shelf from the barbecue grill frame assembly.

According to another aspect of another embodiment of the present invention, the shelf is secured to and removable from the barbecue grill frame assembly without additional hardware. In one embodiment, the first quick release member is a spring member.

According to another aspect of another embodiment of the present invention, the barbecue grill frame assembly has a plurality of leg members and a plurality of cross members extending therebetween. The quick release member of the shelf engages one of the cross members of the barbecue grill frame assembly to secure the shelf to the barbecue grill frame assembly.

According to another aspect of another embodiment of the present invention, a shelf is provided for a barbecue grill having a barbecue grill frame assembly. The frame assembly has a plurality of leg members and a plurality of cross members extending therebetween. The shelf comprises a bottom wall, a plurality of sidewalls depending from the bottom wall, and a first spring member secured to a first of the plurality of sidewalls. The sidewalls have an upstanding portion and a transverse portion. The first spring member secures the shelf to the barbecue grill frame assembly in a first position, and the first spring member adjusts to a second position to allow detachment of the shelf from the barbecue grill frame assembly.

According to another aspect of another embodiment of the present invention, a second spring member is secured to a second of the plurality of sidewalls. The second spring member provides additional securement for securing the shelf to the barbecue grill frame assembly when the second spring member is in a first position. The second spring member also adjusts to a second position to allow detachment of the shelf from the barbecue grill frame assembly.

According to another aspect of another embodiment of the present invention, the sidewalls of the shelf engage the cross members of the barbecue grill frame assembly. In one embodiment the transverse portion of the sidewalls of the shelf are positioned on an upper portion of the cross members of the barbecue grill frame assembly. In another embodiment, the sidewalls further have a downturned portion depending from the transverse portion. The downturned portion engages the cross member of the barbecue grill frame assembly.

According to another aspect of another embodiment of the present invention, a shelf is provided for a barbecue grill having a barbecue grill frame assembly. The shelf comprises a bottom wall and a quick release member depending from the shelf. The quick release member secures the shelf to the barbecue grill frame assembly in a first position.

5 Additionally, the first quick release member adjusts to a second position to allow detachment of the shelf from the barbecue grill frame assembly. In one embodiment the quick release member is a spring member.

According to another aspect of another embodiment of the present invention, the shelf also has a second quick release member depending from the shelf. The second quick release member secures another portion of the shelf to the barbecue grill frame assembly when the
10 second quick release member is in a first position. Further, the second quick release member adjusts to a second position to allow detachment of the other portion of the shelf from the barbecue grill frame assembly.

According to another aspect of another embodiment of the present invention, a shelf is provided for a barbecue grill having a barbecue grill frame assembly. The barbecue grill
15 frame assembly is formed from a plurality of leg members and a plurality of cross members extending therebetween and defining an interior space. In one embodiment the shelf comprises a bottom member and a plurality of sidewalls depending from the bottom wall. The sidewalls have a downturned portion. The shelf is fabricated to be generally positioned
20 within the interior space of the frame assembly such that the downturned portion of opposing sidewalls engages opposing cross members, respectively, of the barbecue grill frame assembly to seat the shelf.

According to another aspect of another embodiment of the present invention, the shelf also has a flexible securing member depending therefrom to fixedly secure the shelf to the
25 barbecue grill frame assembly. In one embodiment the securing member is adapted to move between a first position and a second position. In the second position the securing member slidably engages a portion of an inner wall of the cross member of the barbecue grill frame assembly. In the first position the securing member lockingly engages a portion of a bottom wall of the cross member of the barbecue grill frame assembly. In a preferred embodiment
30 the securing member is biased towards the first position.

According to another aspect of another embodiment of the present invention, the sidewalls of the shelf comprise a U-shaped member depending from the bottom member. In

one embodiment each U-shaped member engages one of the cross-members of the barbecue grill frame assembly to seat the shelf on the barbecue grill frame assembly.

Other features and advantages of the invention will be apparent from the following specification taken in conjunction with the following drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a front elevation view of a barbecue grill assembly including a shelf of the present invention;

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FIG. 2 is an exploded elevation view of the barbecue grill assembly of FIG. 1, showing the shelf connected to a lower frame assembly;

FIG. 3 is a partial elevation view of a first end of the shelf of FIG. 1;

FIG. 4 is a partial elevation view of a second end of the shelf of FIG. 1;

FIG. 5 is a perspective view of a second shelf embodiment;

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FIG. 6 is an exploded view of the shelf of FIG. 5, showing the shelf prior to engagement with a plurality of lower frame members;

FIG. 7 is a partial perspective view of the shelf of FIG. 5, showing the shelf in a first position;

FIG. 8 is a partial perspective view of the shelf of FIG. 5, showing the shelf in a second position;

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FIG. 9 is a partial perspective view of the shelf of FIG. 5, showing the shelf in the second position connected to the lower frame assembly;

FIG. 10 is a perspective view of a third shelf embodiment;

FIG. 11 is a perspective view of the shelf of FIG. 10;

FIG. 12 is a front elevation view of a barbecue grill assembly including another embodiment of the shelf of the present invention;

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FIG. 13 is a bottom perspective view of the shelf of FIG. 12;

FIG. 14 is a top perspective view of the shelf of FIG. 12;

FIG. 15 is a front elevation view of the shelf of FIG. 12;

FIG. 16 is a side elevation view of the shelf of FIG. 12;

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FIG. 17 is a partial perspective view of the spring member of the shelf of the present invention;

FIG. 18 is a partial cut-away perspective view of the shelf of the of the present invention;

FIG. 19A is a partial front elevation view of the shelf of FIG. 12 prior to engagement with the barbecue grill assembly;

5 FIG. 19B is a partial front elevation view of the shelf of FIG. 12 during initial engagement with the barbecue grill assembly;

FIG. 19C is a partial front elevation view of the shelf of FIG. 12 in complete engagement with the barbecue grill assembly; and,

10 FIG. 20 is a perspective view of another embodiment of the shelf of the present invention.

DETAILED DESCRIPTION OF THE INVENTION:

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an
15 exemplification of the principles of the invention and is not intended to limit the broad aspect of the invention to the embodiments illustrated.

A barbecue grill assembly **10** is shown in FIG. 1. The barbecue grill assembly **10** comprises an upper frame assembly **12** and a lower frame assembly **14**. The upper frame
20 assembly **12** has a configuration sufficient to receive and/or support a cooking chamber or firebox **16**. The upper frame assembly **12** is formed from a plurality of upper frame members **13**. In addition, the barbecue grill assembly **10** can include a control panel **18**, controls **20**, temperature gauge **21**, wheels **22**, and casters **24**.

Alternatively, the grill assembly **10** has a single frame assembly. This means that the
25 grill assembly **10** does not have distinct upper and lower assemblies **12**, **14**. In this configuration, the single frame assembly is adapted to receive and/or support the cooking chamber **16**. The single frame assembly is formed from a combination of frame members, including vertical, horizontal, and/or cross-members.

The barbecue grill assembly **10** made according to this invention includes a shelf **50** that
30 is positioned within an interior space **40** of the frame or support structure. In the preferred embodiments shown in the figures, and used in the description herein, the support structure is made up of a number of frame members, including vertical members **26** and a form of

cross-members **28**, such as horizontal struts. The frame members may form a part of the upper assembly **12** and a part of the lower assembly **14**. Alternatively, multiple frame members may be joined to form sub-assemblies that are joined together into the frame assembly. In an alternative embodiment, the interior space **40** may be defined by a plurality of spaced walls of a barbecue grill support cabinet.

The primary function of the shelf **50** is to substantially secure the lower frame assembly **14** in a grill assembly **10** having distinct upper and lower assemblies, and to substantially secure the frame assembly in a grill assembly **10** having a single assembly. In general terms, the shelf **50** secures members in a frame assembly in a generally rectangular configuration. With a grill assembly **10** that has distinct upper and lower assemblies **12**, **14** that are spaced a distance apart, the cooking chamber **16** connects and secures the upper assembly **12** and the shelf **50** connects and secures the lower assembly **14**. With a grill assembly **10** that has distinct left and right assemblies that are spaced a distance apart, the cooking chamber **16** connects and secures a portion of the right and left assemblies and the shelf **50** connects and secures the remaining portion of the right and left assemblies.

The lower frame assembly **14** is partially formed from at least one frame member, including lower vertical members **26** and lower cross-members **28**. The lower assembly **14** includes a shelf **50** positioned within the interior space **40** of the frame structure formed by the assemblies **12**, **14**. Preferably, the members **26**, **28** form two H-shaped sub-assemblies **30** spaced a distance apart to define an interior space **40** adapted to receive the shelf **50**. The shelf **50** is cooperatively dimensioned with the interior space **40** and is adapted to be generally positioned within the interior space **40** to connect the members **26**, **28** and secure the lower frame assembly **14**.

Alternatively, the lower cross-members **28** are omitted and lower horizontal members (not shown) are included in the lower frame assembly **14**. In this configuration, the members **28** and the horizontal members define the interior space **40** and the shelf **50** connects the vertical members **26** and the horizontal members.

Preferably, the members **13**, **26**, **28** have a tubular configuration. However, single-sided and two- or three-sided members are within the scope of the invention. Multi-sided members can have a variety of cross-sectional shapes, including but not limited to square, rectangular, L-shaped, U-shaped, or circular.

In general terms, the shelf **50** is a rigid structure that is positioned within the interior space **40** to join the members **26, 28** and form the lower assembly **14**. Referring to FIG. 2, the shelf **50** provides structural integrity to the lower assembly **14** such that the lower assembly **14** can support the upper assembly **12** and the cooking chamber **16**. In addition to providing structural support to the lower assembly **14**, the shelf **50** is adapted to provide storage for the accessories used in connection with the grill assembly **10**.

As shown in FIGS. 3 and 4, the shelf **50** has a pair of opposed first edges **52** and a pair of opposed second edges **54**. The edges **52, 54** form a perimeter **P** of the shelf **50**. Although shown as having a generally rectangular configuration, the shelf **50** can have a variety of configurations, including square, elliptical or other curvilinear shapes.

Preferably, the shelf **50** is a wire rack formed from a plurality of welded rods. The shelf **50** comprises a plurality of longitudinal rods **60** and a plurality of transverse rods **62**. Although the transverse rods **62** are shown positioned below the longitudinal rods **60**, the orientation of the rods **60, 62** can be varied according to the design parameters of the shelf **50**. A raised or angled portion **64** is positioned proximate the second edge **54**. Alternatively, the raised portion **64** is positioned proximate the first edge **52**. Because the shelf **50** is formed from a plurality of welded rods, the shelf **50** is stronger and more rigid than existing shelves having a thin-wall construction. Although shown as having a plurality of apertures or openings resulting from the intersection of the rods **62, 64**, the shelf **50** can have a solid construction without apertures or openings.

The shelf **50** has at least one pin **70** on each of the first ends **52**. Referring to FIGS. 3 and 4, the pin **70** extends from one of the longitudinal rods **60**. Alternatively, the pin **70** extends from one of the transverse rods **62**. Although five separate pins **70** are shown, the precise number of pins **70** varies with the design parameters of the shelf **50**.

As shown in FIG. 3, the pin **70** has a first portion **70a**, a second portion **70b**, and a third portion **70c**. The first portion **70a** is generally a vertical segment of the pin **70**. The second portion **70b** is generally a horizontal segment of the pin **70**. The third portion **70c** is generally a vertical segment of the pin **70**. The pin **70** is adapted to be removably received by an aperture **80** positioned in the cross-member **28**. The pin **70** and the aperture **80** are in a mating relationship. Accordingly, the pin **70** and the aperture **80** are cooperatively dimensioned such that a portion of the pin **70** is received by the aperture **80**. Also, the pin **70** and the aperture **80** are cooperatively positioned to facilitate the reception of the pin **70**

by the aperture **80**. The aperture **80** has an inner diameter that is adapted for frictional engagement with the pin **70**. Alternatively, the aperture **80** is deformable for frictional engagement with the pin **70**. In a preferred embodiment, the third portion **70c** is removably received by the aperture **80**. When the third portion **70c** is received by the aperture **80**, the second portion **70b** engages a top wall **84** of the cross-member **28** and the first portion **70a** engages an inner wall **82** of the cross-member **28**. Alternatively, a bushing (not shown) is positioned within the aperture **80** wherein the bushing is adapted to receive a portion of the pin **70**. The bushing can be formed from metal or plastic.

As shown in FIGS. 3 and 4, the number of pins **70** can vary between the pair of opposed first edges **52** of the shelf **50**. Similarly, the number of apertures **80** can vary between the opposed sides of the lower assembly **14**. Varying the number of pins **70** and corresponding apertures **80** between the first sides **52** ensures the proper assembly of the lower assembly **14** because the shelf **50** can be connected to the lower frame member **32** in only one manner.

When the shelf **50** is placed within the interior space **40** such that the pin **70** is received by the aperture **80**, the shelf **50** is connected to the lower frame member **28**. As a result, the structural integrity of both the lower assembly **14** and the grill assembly **10** is increased. Described in another manner, the shelf **50** provides structural integrity to the lower assembly **14** and the grill assembly **10** when the pin **70** is received by the aperture **80**.

Depending upon the configuration of the upper assembly **12**, the shelf **50** can be employed to connect to the upper frame members **13** of the upper assembly **12**. In this manner, the shelf **50** provides structural integrity to the upper assembly **12** and the grill assembly **10** when the pin **70** is received by an aperture positioned in the upper frame member **13**.

Because the pin **70** is removably received by the aperture **80**, the shelf **50** can be quickly and easily disengaged from the cross-member **28**. This is an important aspect for packaging and storage of the grill assembly **10** because the dimensions and configuration of the lower assembly **14** can be significantly reduced. In contrast to existing designs, no tools are required to disengage the shelf **50** from the cross-member **28** and disassemble the lower assembly **14**. When the pin **70** is disengaged from the cross-member **28**, the configuration and dimensions of the aperture **80** remain unchanged.

The shelf **50** can include means for locking (not shown) the pin **70** in the aperture **80**. By locking the pin **70** within the aperture **80**, the locking means further increases the

structural integrity of the lower assembly 14. The locking means can include a detent and a cooperating groove, a flange on the pin 70, or a latch.

5 The shelf 50 and its related components, including the pin 52, can be formed from plastic, steel, aluminum, or other metals, including metal alloys. FIGS. 1-4 show an open grill assembly 10, meaning that the upper and lower assemblies 12, 14 are not enclosed. Panels and doors can be added to the grill assembly 10 to form an enclosed cabinet (not shown) positioned beneath the cooking chamber 16. Consistent with the above disclosure, the shelf 50 can be employed within the cabinet to form either a bottom wall or a top wall of the cabinet. In this configuration, the shelf 50 connects the panels and doors and provides structural integrity to the cabinet.

10 In another preferred embodiment, the grill assembly 10 has a single frame assembly, meaning that the grill assembly 10 does not have distinct upper and lower assemblies 12, 14. As a result, there is no junction between the upper and lower assemblies 12, 14 and the grill assembly 10 has a continuous appearance. In this configuration, the single frame assembly is adapted to receive and/or support the cooking chamber 16. The single frame assembly is formed from a combination of frame members, including vertical, horizontal, and/or cross-members. The frame members define an interior space 40 and the shelf 50 is cooperatively dimensioned with the interior space 40 such that the shelf 50 is positioned within the interior space 40.

20 At least one frame member has an aperture cooperatively dimensioned with the pin 70. Preferably, the frame member is located in a lower portion of the single frame assembly. However, the frame member can be located in an upper or intermediate portion of the single frame assembly. The aperture is adapted to removably receive the pin 70. In a manner consistent with the above disclosure, the shelf 50 is connected to the frame member. Consequently, the shelf 50 provides structural integrity to the single frame assembly and the single frame assembly is secured by the connection of the shelf 50 and the frame member.

25 Another preferred embodiment includes a frame for an outdoor cooking device (not shown) generally comprising an upper frame assembly and a lower frame assembly. The shelf 50 is employed within the lower frame assembly in a manner consistent with the above disclosure. Accordingly, the shelf 50 connects the lower assembly and provides structural integrity to the lower assembly.

Instead of receiving a cooking chamber, the frame is adapted to receive a cooking device, for example an auxiliary burner such as an outdoor stove-top burner, or a deep fryer. The frame is adapted to be mobile such that the frame and the cooking device can be moved between various locations, thereby increasing the versatility of the frame.

5 In another preferred embodiment shown in FIG. 5, the grill assembly **10** includes a shelf **150**. The shelf **150** has a pair of opposed first edges **154** and a pair of opposed second edges **156**. The edges **154**, **156** form a perimeter P of the shelf **150**. Although shown as having a generally rectangular configuration, the shelf **150** can have a variety of configurations, including square, elliptical or other curvilinear shapes.

10 The shelf **150** has at least one securing member **152**. The securing member **152** is a flexible structure adapted to be deformed or displaced a distance. Preferably, the securing member **152** extends from the shelf **150** such that a clearance exists between the securing member **152** and the second edge **156**. The dimensions of the clearance varies with the configuration of the securing member **152**. Although shown as having an angular
15 configuration, the securing member **152** can have a curvilinear configuration. Described in a different manner, the securing member **152** is an elongated tab that extends from the shelf **150**.

Preferably, the shelf **150** is a wire rack formed from a plurality of welded rods. The shelf **150** comprises a plurality of longitudinal rods **160** and a plurality of transverse rods
20 **162**. Although the transverse rods **162** are shown in FIG. 5 as being positioned below the longitudinal rods **160**, the orientation of the rods **160**, **162** can be varied according to the design parameters of the shelf **150**. A raised or angled portion **164** is positioned proximate the second edge **156**. Alternatively, the raised portion **164** is positioned proximate the first edge **154**. Because the shelf **150** is formed from a plurality of welded rods, the shelf **150** is
25 stronger and more rigid than existing shelves having a thin-wall construction. Although shown as having a plurality of apertures or openings resulting from the intersection of the rods **162**, **164**, the shelf **150** can have a solid construction without apertures or openings.

The shelf **150** has at least one support member **166**. The support member **166** is adapted to engage a portion of the cross-member **28** when the shelf **150** is connected to the cross-
30 member **28**. Preferably, the support member **166** is positioned near the junction of the first and second edges **154**, **156**. Alternatively, the support member **166** is spaced a distance from the junction of the first and second edges **154**, **156**. Referring to FIG. 7, the support

member **166** has a first portion **166a**, a second portion **166b**, and a third portion **166c** defining a recess adapted to receive a portion of the cross-member **28**. Although the support member **166** is shown as having an angular configuration, the support member **166** can have a number of configurations, including a curvilinear configuration.

5 Although FIG. 5 shows four separate securing members **152** and four separate supporting members **166**, the precise number of these elements varies with the design parameters of the shelf **150** and the lower assembly **14**. Accordingly, the number of securing members **152** and supporting members **166** can be increased or decreased.

10 Referring to FIG. 6, the H-shaped subassemblies **30** of the lower frame assembly **14** are spaced a distance defining the interior space **40**. At an initial position **P0** (not shown), the shelf **150** is generally positioned within the interior space **40** but does not engage any portion of the lower assembly **14**. At the initial position **P0**, the lower assembly **14** lacks structural integrity because the H-shaped assemblies **30** are not connected. At the initial position **P0**, an initial clearance **C0** exists between the securing member **152** and the first edge **154** of the shelf **150**.

15 The shelf **150** is adapted to be moved between the initial position **P0**, a first position **P1**, and a second position **P2**. When a sufficient amount of force is applied to the shelf **150** in a downward direction, the shelf **150** moves from the initial position **P0** towards the first position **P1**. At the first position **P1**, shown in FIG. 7, the shelf **150** is positioned within the interior space **40** and in partial engagement with the lower assembly **14**. Specifically, the securing member **152** slidably engages a portion of the inner wall **170** of the cross-member **28**. In addition, the support member **166** engages a portion of the inner wall **170** and/or an outer wall **174**.

20 The securing member **152** and the support member **166** continue to engage the cross-member as the downward force is applied to the shelf **150**. Accordingly, the securing member **152** flexes inward an amount as the securing member **152** slidably engages the inner wall **170** and moves from a first edge **176** of the inner wall **170** towards a second edge **178** of the inner wall **170**. As the securing member **152** slidably engages the inner wall **170**, a first clearance **C1** exists between the securing member **152** and the shelf **150**.
25 Because the securing member **152** flexes inward an amount, the first clearance **C1** is smaller than the initial clearance **C0**.
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The securing member **152** continues to slidably engage the inner wall **170** as the shelf **150** and the securing member **152** move towards a second position **P2**. At the second position **P2** and as shown in FIGS. 8 and 9, the securing member **152** lockingly engages a portion of a bottom wall **180** of the cross-member **28**. In addition, the support member **166** engages a portion of the inner wall **170**, a top wall **172**, and/or an outer wall **174** of the cross-member **28**. A second clearance **C2** exists between the securing member **152** and the shelf **150** when the securing member **152** engages a portion of the bottom wall **180**. Due to the flexing of the securing member **152** in the first position **P1**, the second clearance **C2** is greater than the first clearance **C1**. In a preferred embodiment, the second clearance **C2** is equal to the initial clearance **C0**.

Referring to FIG. 9, in the second position **P2**, the securing member **152** is in locking engagement with a portion of the bottom wall **180** of the cross-member **28** wherein the locking engagement prevents upward movement of the shelf **150**. The supporting member **166** is in engagement with a portion of the inner wall **170**, a top wall **172**, and/or an outer wall **174** wherein the engagement prevents downward movement of the shelf **150**. Described in a different manner, a portion of the cross-member **28** is received by the recess defined by the first, second, and third portions **166a**, **166b**, **166c** of the supporting member **166**. Consequently, the shelf **150** is locked in a stable position and as a result, the lower assembly **14** has increased structural rigidity. Described in another manner, the shelf **150** provides structural integrity to the lower assembly **14** when the securing member **152** and the support member **166** are located in the second position **P2**. As a result, the lower assembly **14** has a sufficient amount of stability to permit the alignment and engagement of the upper assembly **12** with the lower assembly **14**. In a configuration with a grill assembly having a single frame with no distinct upper and lower assemblies, in the second position **P2**, the securing member **152** and the supporting member **166** connect and secure the single frame of the grill assembly.

Alternatively, the securing member **152** is lockingly engaged by a structure formed in a portion of the cross-member **28** in the second position **P2**. For example, the securing member **152** is lockingly engaged by a detent formed in a portion of the cross-member **28**. Unlike the support member **166**, the securing member **152** is adapted to be deformed between the initial, first and second positions **P0**, **P1**, **P2**. This means that the securing member **152** deforms or flexes inward as it slidably engages the inner wall **170** of the cross-

member **28**. The degree or amount of deformation varies with the dimensions and configuration of the securing member **152**. Preferably, the securing member **152** is biased towards the initial position **P0** or the second position **P2**.

5 The shelf **150** and its related components can be formed from plastic, steel, aluminum, or other metals, including metal alloys. The securing member **152** is preferably formed from metal because of its high strength and favorable deformation properties. Depending upon the material used to form the securing member **152**, the degree and amount of elastic deformation of the securing member **152** will vary.

10 In another preferred embodiment shown in FIGS. 10 and 11, the grill assembly **10** includes a shelf **250**. The shelf **250** has a pair of opposed first edges **254** and a pair of opposed second edges **256**. The edges **254**, **256** form a perimeter **P** of the shelf **250**. Although shown as having a generally rectangular configuration, the shelf **250** can have a variety of configurations, including square, elliptical or other curvilinear shapes.

15 The shelf **250** has at least one securing member **252**. The securing member **252** is a flexible structure adapted to be deformed or displaced a distance. Preferably, the securing member **252** extends from the shelf **250** such that a clearance exists between the securing member **252** and the second edge **256**. Although shown as having an angular configuration, the securing member **252** can have a curvilinear configuration. Described in a different manner, the securing member **252** is an elongated tab that extends from the shelf **250**.

20 Preferably, the shelf **250** is a wire rack formed from a plurality of welded rods. The shelf **250** comprises a plurality of longitudinal rods **260** and a plurality of transverse rods **262**. Although the transverse rods **262** are shown in FIGS. 10 and 11 as being positioned below the longitudinal rods **260**, the orientation of the rods **260**, **262** can be varied according to the design parameters of the shelf **250**. A raised or angled portion **264** is positioned proximate the second edge **256**. Alternatively, the raised portion **264** is positioned proximate the first edge **254**. Because the shelf **250** is formed from a plurality of welded rods, the shelf **250** is stronger and more rigid than existing shelves having a thin-wall construction. Although shown as having a plurality of apertures or openings resulting from the intersection of the rods **262**, **264**, the shelf **250** can have a solid construction without apertures or openings.

25 30 The shelf **250** has at least one support member **266** extending from the first edge **254**. The support member **266** is adapted to engage a portion of the cross-member **28** when the

shelf **250** is connected to the cross-member **28**. Referring to FIGS. 10 and 11, the support member **226** has a first portion **266a**, a second portion **266b**, and a third portion **266c**, and a fourth portion **266d** defining a recess adapted to receive a portion of the cross-member **28**. Preferably, the recess has dimensions slightly larger than the dimensions of the cross-member **28**. The support member **226** has an angled or sloped configuration which facilitates engagement with the lower member **28** without causing abrasions on the lower member **28**. Although the support member **266** is shown as having an angular configuration, the support member **266** can have a number of configurations, including a curvilinear configuration.

The shelf **250** has at least one finger **290** extending from the first edge **254**. The finger **290** has a first portion **290a** that is substantially vertical. The finger **290** is adapted to engage a portion of the cross-member **28** when the shelf **250** is connected to the cross-member **28**. Specifically, the finger **290** engages a portion of the inner wall **170** of the cross-member **28**.

Although FIGS. 10 and 11 show two separate securing members **252**, two separate supporting members **266**, and two separate fingers **290**, the precise number of these elements varies with the design parameters of the shelf **250** and the lower assembly **14**. Accordingly, the number of securing members **252**, supporting members **266**, and the fingers **290** can be increased or decreased.

At an initial position **P0** (not shown), the shelf **250** is generally positioned within the interior space **40** but does not engage any portion of the lower assembly **14**. At the initial position **P0**, the lower assembly **14** lacks structural integrity because the H-shaped assemblies **30** are not connected. At the initial position **P0**, an initial clearance **C0** exists between the securing member **252** and the first edge **254** of the shelf **250**.

The shelf **250** is adapted to be moved between the initial position **P0**, a first position **P1**, and a second position **P2**. When a sufficient amount of force is applied to the shelf **250** in a downward direction, the shelf **250** moves from the initial position **P0** towards the first position **P1**. At the first position **P1**, the shelf **250** is positioned within the interior space **40** and in partial engagement with the lower assembly **14**. Specifically, the securing member **252** slidably engages a portion of the inner wall **170** of the cross-member **28**. Also, the support member **266** slidably engages a portion of the inner wall **170** and/or an outer wall

174. In addition, the finger **290** slidably engages a portion of the inner wall **170** of the cross-member **28**.

The securing member **252**, the support member **266**, and the finger **290** continue to engage the cross-member **28** as the downward force is applied to the shelf **150**.

Accordingly, the securing member **152** flexes inward an amount as the securing member **152** slidably engages the inner wall **170** and moves from a first edge **176** of the inner wall **170** towards a second edge **178** of the inner wall **170**. As the securing member **252** slidably engages the inner wall **170**, a first clearance **C1** exists between the securing member **252** and the shelf **250**. Because the securing member **252** flexes inward an amount, the first clearance **C1** is smaller than the initial clearance **C0**.

The securing member **252** continues to slidably engage the inner wall **170** as the shelf **250** and the securing member **252** move towards a second position **P2**. At the second position **P2**, the securing member **252** lockingly engages a portion of a bottom wall **180** of the cross-member **28**. Also, the support member **266** engages a portion of the inner wall **170**, a top wall **172**, and/or an outer wall **174** of the cross-member **28**. In addition, the first portion **290a** of the finger **290** engages a portion of the inner wall **170**. A second clearance **C2** exists between the securing member **252** and the shelf **250** when the securing member **252** engages a portion of the bottom wall **180**. Due to the flexing of the securing member **252** in the first position **P1**, the second clearance **C2** is greater than the first clearance **C1**. In a preferred embodiment, the second clearance **C2** is equal to the initial clearance **C0**.

In the second position **P2**, the securing member **252** is in locking engagement with a portion of the bottom wall **180** of the cross-member **28** wherein the locking engagement prevents upward movement of the shelf **250**. The supporting member **266** is in engagement with a portion of the inner wall **170**, a top wall **172**, and/or an outer wall **174** wherein the engagement prevents downward movement of the shelf **250**. The finger **290** is in engagement with a portion of the inner wall **170** wherein the engagement prevents lateral movement between the structures of the lower assembly **14**. Consequently, the shelf **250** is locked in a stable position and as a result, the lower assembly **14** has increased structural rigidity. Described in another manner, the shelf **250** provides structural integrity to the lower assembly **14** when the securing member **252**, the support member **266**, and the finger **290** are located in the second position **P2**. As a result, the lower assembly **14** has a

sufficient amount of stability to permit the alignment and engagement of the upper assembly **12** with the lower assembly **14**.

The shelf **250** and its related components can be formed from plastic, steel, aluminum, or other metals, including metal alloys.

5 The barbecue grill assembly **10** can be assembled in a method involving a small number of steps. The shelf **50** is positioned within the lower frame assembly **14** and connected to the frame member **26, 28** in the manner disclosed above. Thus, the shelf **50** connects and secures the lower assembly **12**. The upper frame assembly **12** can then be brought into engagement with the lower assembly **14**. The cooking chamber **16** and the related controls
10 can then be positioned on the upper assembly **12**. Alternatively, the cooking chamber **16** is connected to the upper assembly **12** to secure the upper assembly **12**. Next, the upper assembly **12** is brought into engagement with the lower assembly **14**. Means for securing the upper and lower assemblies **12, 14** are then applied to secure the grill assembly **10**. Securing means can include a threaded fastener and nut, or a projection and a receiver.

15 Alternatively, the grill assembly **10** can have single frame assembly without distinct lower and upper assemblies **12, 14**. Consistent with the above disclosure, the shelf **50** is connected and secured to a lower portion of the single frame assembly. Next, the cooking chamber **16** is connected and secure to an upper portion of the single frame assembly. Means for securing the single frame assembly are then applied to secure the grill assembly
20 **10**. Securing means can include a threaded fastener and nut, or a projection and a receiver.

 Another embodiment of the shelf **300** of the present invention is shown in FIGS. 12 - 19C. As shown in FIG. 12, this embodiment of the shelf **300** is connected to a barbecue grill frame assembly **302**. The barbecue grill frame assembly **302** may be a multiple frame assembly or a single frame assembly, as described above. A single frame assembly is
25 illustrated in FIG. 12. The frame assembly **302** includes a plurality of leg members **304**, and a plurality of cross-members **306** extending therebetween. As such, the grill frame assembly **302** defines an interior space between the leg members **304** of the barbecue grill frame assembly **302**. It is understood by those of skill in the art that the shelf **300** of the present invention may be utilized with any frame structure, including structures with walls and/or
30 cabinet doors.

 As shown in FIGS. 12 and 18, the shelf **300** of the present invention is cooperatively dimensioned such that the shelf **300** is substantially positioned within the interior space of

the barbecue grill frame assembly **302**. In this position a substantial portion of the shelf **300** is located within the interior space of the barbecue grill frame assembly **302**.

In one embodiment, the shelf **300** has a securing member **308**, as shown in FIG. 13. The securing member **308** may comprise any component which is capable of securing the shelf **300** to the barbecue grill frame assembly **302**. In one embodiment, the securing member **308** is connected to the shelf **300** with a rivet **342**. The securing member **308** is used to removably secure the shelf **300** to the barbecue grill frame assembly **302**. As illustrated in the preferred embodiments of the invention, the securing member **308** comprises a quick release member or a flexible spring member. Such a spring member **308** may be a leaf spring type member or other spring that can be moved from a first position to a second position through the application of force, but which is biased toward the first position and returns to the first position when the force is removed.

As shown in FIGS. 13-16, one preferred embodiment of the shelf **300** of the present invention is provided. The shelf **300** comprises a bottom wall **310**, two pair of opposing sidewalls **312**, **314** and **316**, **318**, and opposing securing members **308a**, **308b**. The first pair of opposing sidewalls comprises a first sidewall **312** and a second sidewall **314** opposing the first sidewall **312**, and the second pair of opposing sidewalls comprises a third sidewall **316** and a fourth sidewall **318** opposing the third sidewall **316**. The shelf **300** may be made with a bottom wall **310** that is substantially solid, or with one that has a plurality of apertures therethrough. Additionally, the shelf **300** may be made of a wire rack connected to securing members **308**. In a preferred embodiment, the bottom wall **310** of the shelf **300** is substantially planar, however it may be domed concave or convex.

The sidewalls **312-318** depend from the bottom wall **310**. And, the opposing securing members **308a**, **308b** depend from opposing first and second sidewalls **312**, **314**. As shown in FIGS. 13-16, two securing members **308a**, **308b** are utilized. However, as is understood by those having ordinary skill in the relevant art, more or less than two securing members **308** may be incorporated into the present invention. Additionally, if more than one securing member **308** is utilized, they may be located on adjacent sidewalls, or they may be located on opposing sidewalls. Further, the securing members **308** may be connected to the bottom wall **310** of the shelf **300**.

In one preferred embodiment, as best shown in FIGS. 15 and 17, the sidewalls **312-318** have an upstanding member **320**, a transverse member **322** and a downturned member **324**.

Such a configuration may result in an inverted U-shaped member that depends from the bottom member **310**. Typically, each U-shaped member engages a different cross-member **306** of the barbecue grill frame assembly **302** to seat the shelf **300** on the barbecue grill frame assembly **302**. Accordingly, as shown in FIGS. 12 and 18, the first U-shaped member **312** engages a first cross member **326** of the barbecue grill frame assembly **302**, the second U-shaped member **314** engages a second cross member **328** of the barbecue grill frame assembly **302**, the third U-shaped member **316** engages a third cross member **330** of the barbecue grill frame assembly, and the fourth U-shaped member **318** engages a fourth cross member **332** of the barbecue grill frame assembly.

In a preferred embodiment, including where the shelf **300** is made from a piece of sheet material, the sidewalls **312-318** are typically made from the same material as the bottom wall **300** of the shelf **300**. As such, the sidewalls **312-318** may be made by bending the perimeter portions of the shelf **300** to create the various members (i.e., upstanding member **320**, a transverse member **322** and a downturned member **324**) of the shelf **300**. Generally, the upstanding member **320** of the sidewall depends directly from the bottom wall **310** of the shelf **300**. In alternative embodiments, all of some of the sidewalls **312-318** may be made of only one or more of the various members **320-324** of the sidewall. As such, a sidewall may be made of only a downturned member **324**; alternatively, a sidewall may be made of only a transverse member **322**; alternatively, a sidewall may be made of a transverse member **322** and a downturned member **324**; alternatively, a sidewall may be made of an upstanding member **320** and a transverse member **322**. Further, additional alternatives exist. Generally, each of the alternative sidewall structures would depend from the bottom wall.

As shown in FIGS. 12 and 19A-19C, in one preferred embodiment, when the shelf **300** is seated on the barbecue grill frame assembly **302**, the first and second sidewalls **312, 314** that have securing members **308a, 308b** are seated on the cross members **326, 328** by having the downturned members **324** and the transverse members **322** of these sidewalls **312, 314**, as well as the securing members **308a, 308b** engage the respective cross members **326, 328** of the barbecue grill frame assembly **302** to fully seat the shelf **300**. With respect to the third and fourth sidewalls **316, 318** of this embodiment that do not have securing members **308**, typically only the transverse members **322** and possibly the downturned members **324** engage the respective cross members **330, 332**. The upstanding member **320** of the third and fourth sidewalls **316, 318** may, however, engage the cross members **330, 332**. Drain areas to

allow water and other fluid debris to drain from the shelf **300** are provided in each of the corners of the shelf **300** where the sidewalls **312-318** of the shelf **300** meet the leg members **304** of the barbecue grill.

The securing member **308** is typically a flexible structure that is adapted to be deformed or displaced a distance. In a preferred embodiment, the securing member **308** is a spring that moves from a first position, as shown in FIG. 19C, where the shelf **300** is secured to the barbecue grill frame assembly **302**, to a second position, as shown in FIG. 19B, to allow the shelf **300** to be detached from the barbecue grill frame assembly **302**. The securing member **308** may also move to a third position, as shown in FIG. 19A, which is the securing members **308** natural or rest position. In this position the securing member **308** is not engaging the cross member of the barbecue grill frame assembly **302**. Depending on the shape of the cross member and the sidewalls of the shelf **300**, the configuration of the securing member **308** in the third position may be the same as the configuration of the securing member **308** in the first position.

Referring to FIG. 19A, which shows one of the securing members **308**, the securing member **308a** is shown just prior to the shelf **300** engaging the barbecue grill frame assembly **302**. As such, the securing member is shown in the third position. As the shelf **300** is pushed downward, the securing member **308a** and the downturned member **324** of the sidewall **312** engage the cross member **326**. When a sufficient force is applied to the shelf **300** in a downward direction, the shelf **300** moves from the third position (the rest position) to the second position. In moving to the second position, as shown in FIG. 19B, the engaging member **308a** flexes inward toward the upstanding member **320** of the shelf **300** as the engaging member **308a** slidably engages a portion of the inner wall **334** of the cross member **326**. The engaging member **308a** continues to remain in the second position, and continues to slidably engage a portion of the inner wall **334** of the cross member **326** until the engaging member **308a** reaches the first position, as shown in FIG. 19C. In a preferred embodiment, the securing member **308** is biased toward the first position. In the first position, the shelf **300** is secured to the barbecue grill frame assembly **302**. In the first position, a detent **311** in the engaging member **308a** lockingly engages a portion of the bottom wall **336** of the cross member **326** of the barbecue grill frame assembly **302**. Typically, it is the detent **311** portion of the securing member **308** that slidably engages the cross member **326** of the barbecue grill frame assembly **302** during movement in the second

position described above. If a second securing member **308b** was incorporated into the shelf **300**, then that securing member **308b** would also be adjusted from the first position to the second position. Further, in the first position the transverse member **322** of the shelf **300** is positioned on an upper portion **338** of the cross member **326** of the barbecue grill frame assembly **302**, and the downturned portion **324** of the shelf **300** is positioned adjacent and contacting an outer portion **340** of the cross member **326** of the barbecue grill frame assembly **302**. The sidewall components in combination with the detent **311** contacting the portion of the bottomwall **336** of the cross member **326** operates to substantially prevent upward and downward movement of the shelf **300** when in the first position. And, the various components of the sidewalls (i.e., the downturned portion **324** and the upstanding portion **320**) substantially prevent front-to-back and side-to-side lateral movement of the shelf **300** in the first position.

The securing member **308** is adapted to move from the first position, to the second position, to the third position, and the reverse. To remove or detach the shelf **300** from the barbecue grill frame assembly **302**, as shown in FIGS. 19A-19C, the securing member **308a** is adjusted from the first position to the second position. As explained above, in the first position (FIG. 19C) the securing member **308a** lockingly engages a portion of the bottom wall **336** of the cross member **326** of the barbecue grill frame assembly **302**. To release the securing member **308a**, a release portion **309** of the securing member **308a** is pushed away from the cross member **326** and toward the upstanding member **320** of the shelf **300**. Substantially at the same time, or shortly thereafter, a force is exerted on the shelf **300** to raise the shelf **300**. At this time, the engaging member **308a** moves to the second position, as shown in FIG. 19B. As the shelf **300** is raised in the second position, the engaging member **308a** slidingly engages a portion of the inner wall **334** of the cross member **326** until the shelf **300** is lifted above the cross members. When the engaging member **308a** no longer engages the cross member **326**, the engaging member will move to the third position, illustrated in FIG. 19A. All of the engaging members **308** operate in the same manner to both secure the shelf **300** to the barbecue grill frame assembly **302**, and to allow the shelf **300** to be detached from the barbecue grill frame assembly **302**. In this manner, the shelf **300** can be both secured to and removed from the barbecue grill frame assembly **302** without additional hardware.

Additionally, the shelf **300** may be utilized without a securing member **308**. In such an embodiment, the shelf **300** is configured and fabricated to allow one or more of the sidewalls **312-318** to engage the cross members of the barbecue grill frame assembly **302**. In one such embodiment, shown in FIG. 20, the sidewalls **312-318** have a downturned portion **324**. The downturned portion **324** of opposing sidewalls **312, 314** engages opposing cross members **326, 328** to seat the shelf **300** and secure the shelf **300** within the interior space of the barbecue grill frame assembly **302**. As explained above, various combinations or alternatives of the sidewall members may also be incorporated in this embodiment without departing from the scope of the present invention. Alternatively, a flexible securing member **308** may be incorporated into the above structure to assist in securing the shelf **300** to the frame assembly **302**.

While specific embodiments have been illustrated and described, numerous modifications come to mind without significantly departing from the spirit of the invention and the scope of protection is only limited by the scope of the accompanying Claims.